# 2 Drainage Control Activities by the Grassland Area Farmers

October 1, 2001 – December 31, 2002

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Grassland Bypass Project

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# Introduction

The Grassland Area Farmers formed a regional drainage entity in March 1996 under the umbrella of the San Luis and Delta-Mendota Water Authority to implement the Grassland Bypass Project. The Project consolidates subsurface drainage flows on a regional basis and utilizes a portion of the federal San Luis Drain to convey the flows around the habitat areas (see Figure 1). Participants include the Broadview Water District, Charleston Drainage District, Firebaugh Canal Water District, Pacheco Water District, Panoche Drainage District, Widren Water District and the Camp 13 Drainage District (located in part of Central California Irrigation District). This entity includes approximately 97,000 gross acres of irrigated farmland on the Westside of the San Joaquin Valley, referred to as the Grassland Drainage Area. The area is highly productive, producing an estimated $113 Million annually in agricultural crop market value, with an additional estimated $126 Million generated for the local and regional economies, for a total estimated economic value of $239 Million.

The Grassland Area Farmers have implemented several activities aimed at reducing discharge of subsurface drainage waters to the San Joaquin River. These activities have included the Grassland Bypass Project and the San Joaquin River Water Quality Improvement Project. They also include: formation of a regional drainage entity, newsletters and other communication with the farmers, a monitoring program, using State Revolving Fund loans for improved irrigation systems, utilizing and installing drainage recycling systems to mix subsurface drainage water with irrigation supplies under strict limits, tiered water pricing and tradable loads programs.

# Grassland Bypass Project

The Grassland Bypass Project is an innovative program that was designed to improve water quality in the channels used to deliver water to wetland areas. Prior to the Project, subsurface drainage water was conveyed through those channels in route to the San Joaquin River and limited their availability to deliver high-quality habitat supplies. The Project consolidates subsurface drainage flows on a regional basis and utilizes a portion of the federal San Luis Drain to convey the flows around the habitat areas. Figures 2A and 2B shows the discharge from the Grassland Bypass Project from WY 1997 through the end of calendar year 2002.

Negotiations between the San Luis & Delta-Mendota Water Authority and the U S Bureau of Reclamation to utilize a portion of the San Luis Drain for the Project commenced in 1988. Stakeholders included in the process were: U.S. Environmental Protection Agency, U.S. Fish & Wildlife Service, California Department of Fish and Game, the Central Valley Regional Water Quality Control Board, Environmental Defense, Contra Costa County and Contra Costa Water District. In late 1995, environmental documentation for the first five years was completed and the Use Agreement was signed. Discharge through the project began in September 1996. In September 2001, the Use Agreement was extended for another 8 years and 3 months (through December 2009). An Environmental Impact Report/Environmental Impact Statement was completed and on September 7, 2001 the Central Valley Regional Water Quality Control Board issued new Waste Discharge Requirements. Other items completed to support the continued use

were a Biological Assessment/Biological Opinion, a selenium Total Maximum Monthly Load (TMML) report submitted by the Regional Board to EPA and a continued monitoring program. The new Use Agreement contains continued reductions in selenium discharge until ultimately TMML limits are achieved in 2005 for above normal and wet years and continued progress is made to meet water quality objectives in 2010 for below normal, dry and critical years. The future load limits are shown on Figure 3.

The benefits of the Grassland Bypass Project are well documented. In water year (WY) 2002, drainage volume has been reduced 46%, selenium load has been reduced 61%, salt load has been reduced 41% and boron load has been reduced 34%, all from pre-project conditions in WY 1996 (see Table 1).

In WY 1996, prior to the Grassland Bypass Project, the mean selenium concentration in Salt Slough at Lander Avenue was 16 parts per billion (ppb). Since October 1996, the 2 ppb water quality objective for Salt Slough has been met in all months except one. The only month in which objectives were not met was February 1998 when uncontrollable flood flows were mixed with subsurface drainage water and could not be contained within the Grassland Bypass Project (that month the selenium concentration in Salt Slough was 4 ppb). In WY 1996 the mean selenium concentration at Camp 13 Ditch was 55.9 parts per billion (ppb). In WY 1997, the first year of operation of the Grassland Bypass Project, the mean selenium concentration at Camp 13 Ditch was 2.6 ppb. This value was slightly above the wetland selenium objective of 2 ppb. In April of 1998, specific actions were taken to eliminate any possible subsurface drainage discharges from the Grassland Drainage Area into the Camp 13 Slough and other discharge points. Since that time, there have been no discharges from the Grassland Drainage Area into wetland channels. However, the 2ppb monthly mean selenium objective was exceeded in wetland supply channels in WY 2003. A number of sources may contribute to the exceedance (see Chapter 4) and further investigations are underway.

## San Joaquin River Water Quality Improvement Project

Funds provided from Proposition 13 allowed for the purchase and improvement of 4,000 acres of land within the Grassland Drainage Area as part of the San Joaquin River Water Quality Improvement Project (SJRIP) for the purpose of drain water disposal. The location of the SJRIP Project is shown in Figure 1 and the cropping details for WY 2002 are shown in Figure 4. The first phase of the SJRIP was implemented in the winter of WY 2001 with the planting of salt tolerant crops and construction of distribution facilities. Since the project's inception, the planted acreage has increased from the original 1,821 acres to more than 2,420 acres, which have been irrigated with drainage water or blended water. In 2002, more than 3,700 acre-feet of drain water was applied to the project, reusing more than 1,100 pounds of selenium, 17,700 tons of salt, and 77,000 pounds of boron (see Figure 5). Additionally, almost three miles of irrigation pipeline and 500 acres of subsurface drainage systems were installed in 2002 as part of the Grassland Integrated Drainage Management Project (funded by Proposition 13).

The SJRIP project is the key for the Grassland Drainage Area as a whole to meet future selenium load limits. This project will ultimately allow for planting and irrigation of the entire 4,000 acres with drainage water. Future phases call for acquisition of additional acreage,

installation of subsurface drainage systems and implementation of treatment and salt disposal components.

## Other Activities

The Grassland Area Farmers and member districts are continuing advances into drainage management and disposal with the cooperation of federal and state agencies. Research is being undertaken in algal bacteria selenium treatment, reverse osmosis treatment, flow through selenium removal and individual district reuse projects. Continued funding is being sought for these activities. An estimate has been made of the components of subsurface drainage within the GDA. This information is shown in Figure 5.

Future regulations may include salt and boron discharge limits to the San Joaquin River. The Grassland Area Farmers are active participants in this process as well other regulatory efforts such as the dissolved oxygen issue in the San Joaquin River.

**Table 1. Grassland Bypass Project**
**Summary of Annual Volumes and Loads**

| | WY 1996 | WY 1997 | WY 1998 | WY 1999 | WY 2000 | WY 2001 | WY 2002 | % Reduction from 1996 |
|---|---|---|---|---|---|---|---|---|
| Volume of Drainage Discharge (af) | 53,000 | 39,860 | 49,244 | 32,310 | 31,260 | 28,254 | 28,391 | 46% |
| Selenium Load (lbs) | 10,036 | 7,093 | 9,118 | 5,124 | 4,603 | 4,377 | 3,939 | 61% |
| Boron Load (lbs) | 830,700 | 682,300 | 967,200 | 630,200 | 606,700 | 423,300 | 550,500 | 34% |
| Salt Load (tons) | 197,500 | 172,600 | 213,500 | 149,100 | 135,000 | 120,000 | 116,100 | 41% |

Note: WY 1997 and 1998 include discharges through wetlands channels.

**Figure 1**

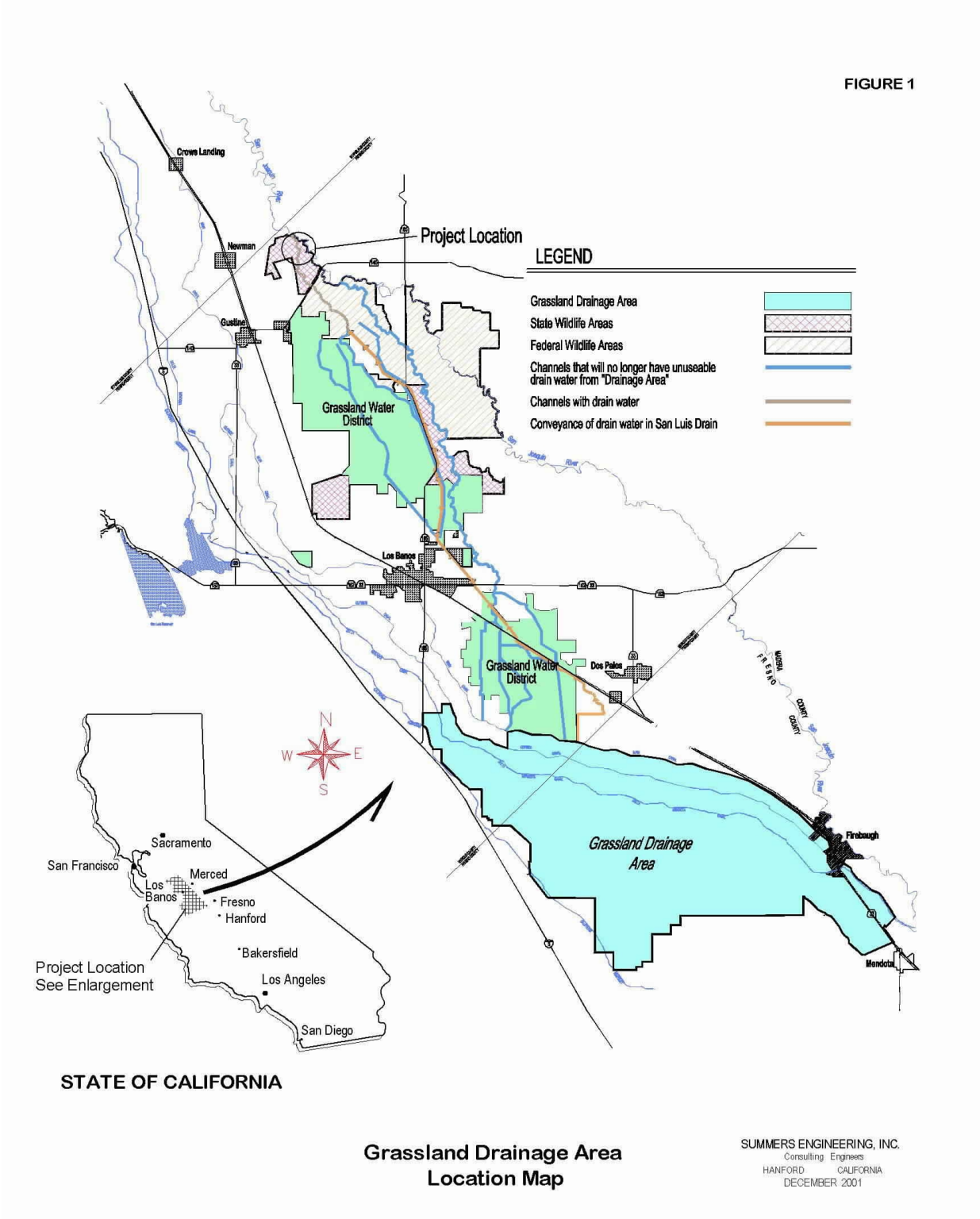
FIGURE 1
Crows Landing
Newman
Gustine
Project Location
LEGEND
Grassland Drainage Area
State Wildlife Areas
Federal Wildlife Areas
Channels that will no longer have unuseable drain water from "Drainage Area"
Channels with drain water
Conveyance of drain water in San Luis Drain
Grassland Water District
Los Banos
Grassland Water District
Dos Palos
Grassland Drainage Area
Firebaugh
Mendota
FRESNO COUNTY
MERCED COUNTY
N
W
E
S
Sacramento
San Francisco
Merced
Los Banos
Fresno
Hanford
Bakersfield
Project Location See Enlargement
Los Angeles
San Diego
STATE OF CALIFORNIA
Grassland Drainage Area Location Map
SUMMERS ENGINEERING, INC.
Consulting Engineers
HANFORD CALIFORNIA
DECEMBER 2001

**Figure 2a. Discharge from the Grassland Bypass Project**
**October 1996 – September 2001 (Phase I)**

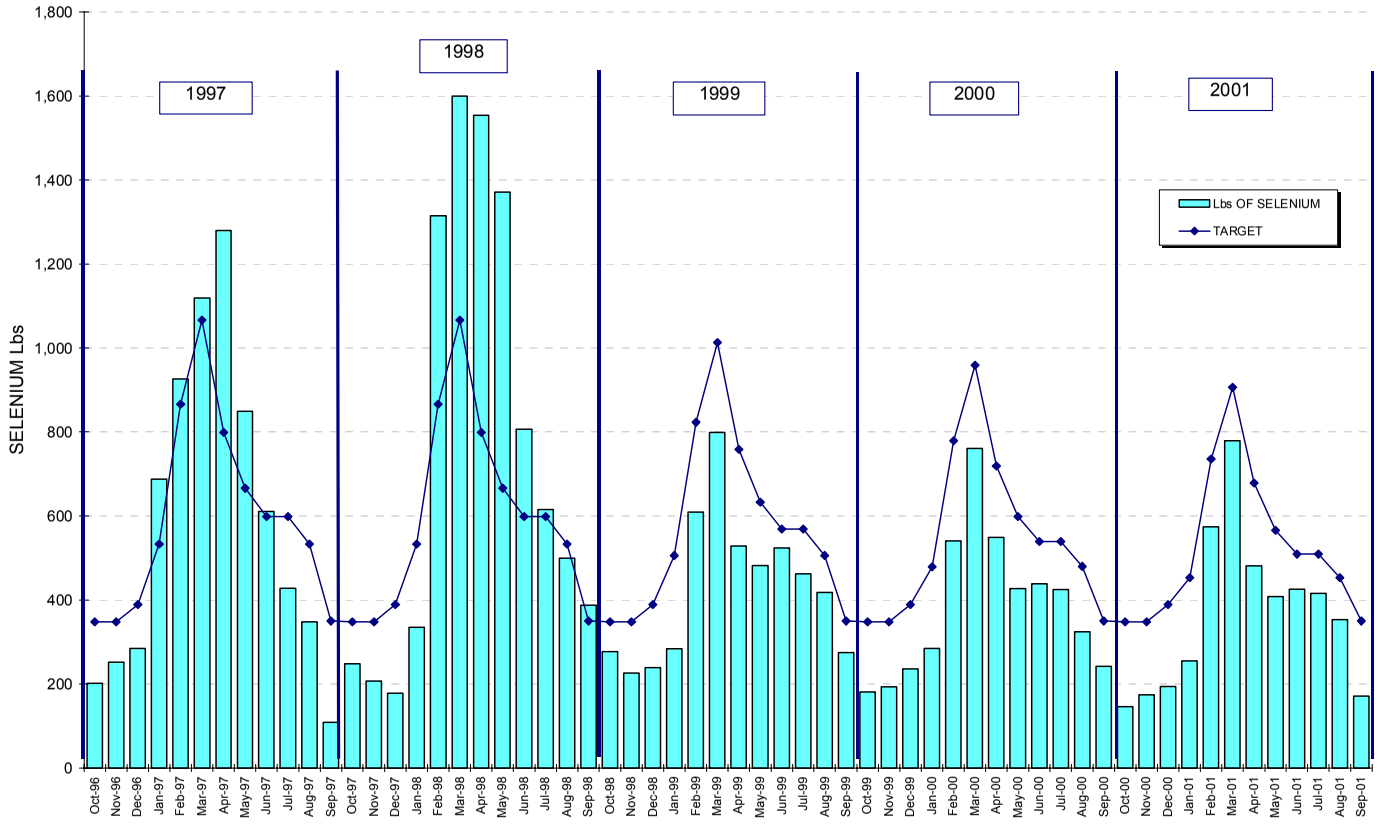

**Figure 2b. Discharge for the Grassland Bypass Project October 2000 Through December 2002 (Phase II)**

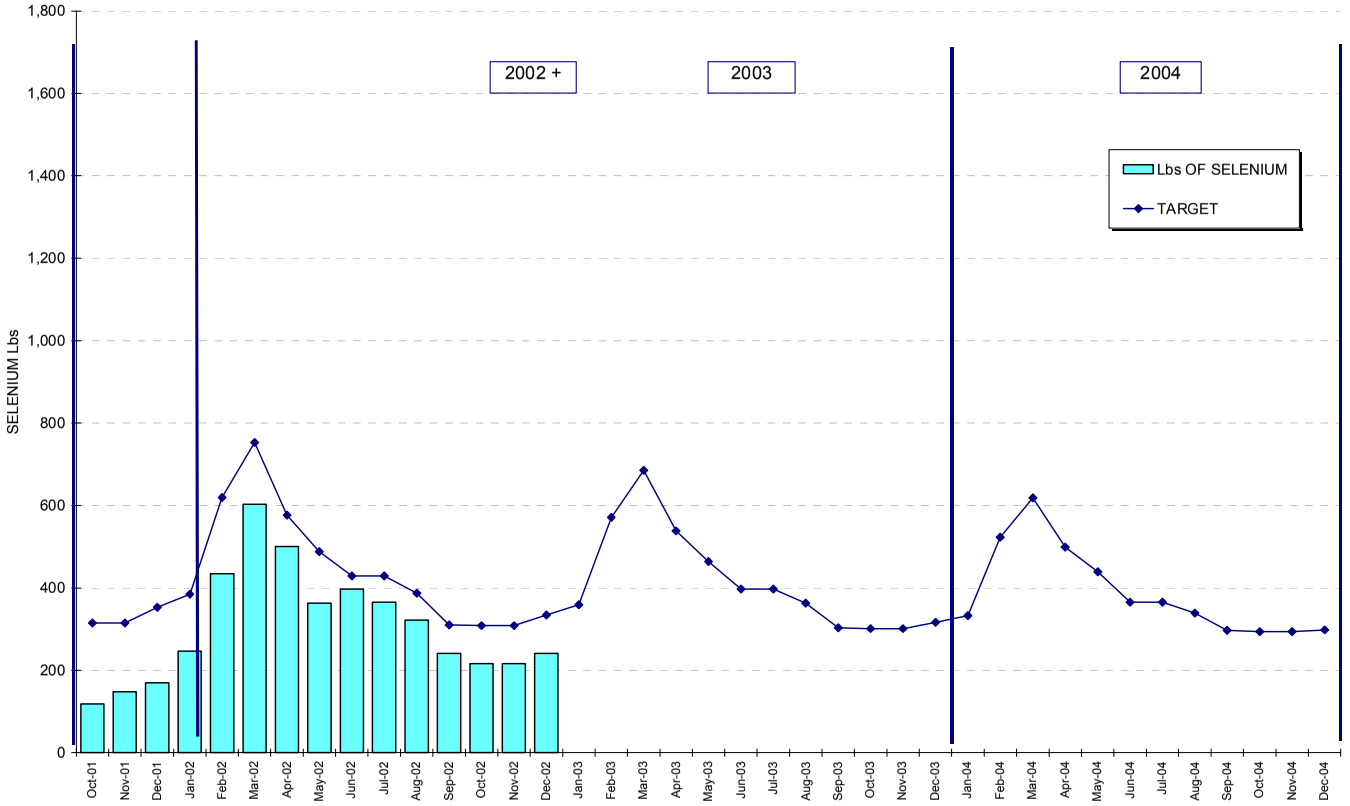

**Figure 3. Grassland Drainage Area: Selenium Discharge and Targets**

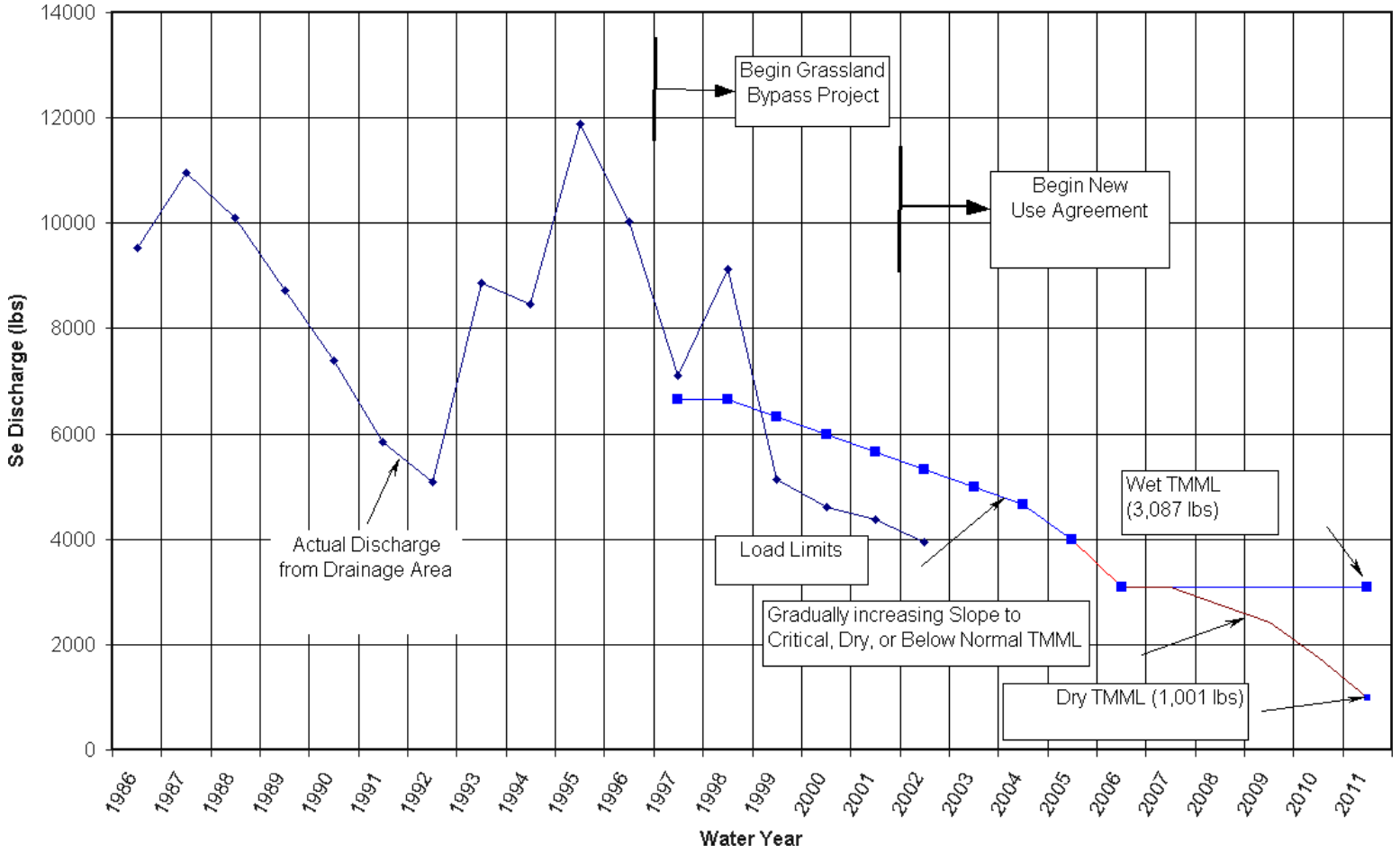

FIGURE 4


**LEGEND**

| Acreage | Crop |
|---|---|
| 60 | Salado Alfalfa |
| 72 | Alfalfa Seed |
| 122 | Alfalfa / Pasture Grass |
| 220 | Asparagus |
| 276 | Alfalfa Seed / Pasture Grass |
| 474 | Alfalfa |
| 180 | Alfalfa - Firebaugh Canal Water District |
| 1100 | Pasture |
| 28 | New Eucalyptus Trees |
| 10 | Pistachio Trees |
| 1453 | Fallow |
| | Fenced Areas (402 Acres) |
| 3873 | Total Acres |

**PANOCHE DRAINAGE DISTRICT**

**San Joaquin River Water Quality Improvement Project**
**2002 Crop Map**

SUMMERS ENGINEERING, INC.
Consulting Engineers
HANFORD CALIFORNIA
October 2002

**Figure 5. Historic Drainage Water (lbs Selenium)**
**57,000 AF 12,700 lbs Se 240,000 Tons Salt**